

REMARKS

Claims 1-11 are all the claims currently pending in the present application.

Claim Rejections

Claims 1, 4, 8-9, and 11 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Sugihara, U.S. Patent Publication No. 2002/0192939 (“Sugihara”). Claims 1 and 8-11 stand rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Takao, U.S. Patent Publication No. 2004/0137701 (“Takao”). Claims 2-7 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Takao.

The present invention relates to a method of forming a penetration electrode comprising the steps of: providing a silicon substrate, both surfaces of which are covered with an insulating layer; providing an electroconductive film on a first surface at least in an area in which a penetration electrode is to be formed; forming a protective member on the conductive film for protecting the electroconductive surface; forming a micropore which penetrates through the substrate from a second surface; and inserting an electroconductive substance into the micropore to provide an electroconductive path to the electroconductive film.

Exemplary features of the present invention are: (a) both substrate surfaces and the inside surface of the micropore are covered by an insulating layer (for example of several micrometers), for insulating the inside of the silicon substrate; (b) a conductive film is formed on a first surface in an area in which a micropore is to be formed, and, after forming the micropore, a protective member, which is thicker than the conductive film, is formed on the conductive film so that the

conductive film is protected from breakage due to the pressure applied to the conductive film when the conductive substance is inserted into the micropore; (c) the protective member is made of a hard material, such as glass or ceramics, for supporting the conductive film from pressure applied when inserting the conductive substance; and (d) the protective member is removed after forming the penetration electrode, by using a hot-melt adhesive or ultraviolet curing resin for adhering the protective member.

Claims 1, 4, 8, 9, and 11 over Sugihara.

In contrast to the present invention, Sugihara discloses a method of forming a contact element. The Sugihara method includes a film comprising a thin copper foil on a polyimide layer, and a thin film of nickel and gold formed on the copper film. A laser is used to form bump holes through the polyimide layer and a protection layer is disposed on the gold layer to protect it while the nickel bumps are formed by plating. The protection layer is not removed after forming the contact element.

As an initial matter the Examiner has failed to respond to all of Applicants' arguments set forth specifically at page 9 of the Amendment filed on March 1, 2005. In contrast to the requirements of MPEP §707.07(f)¹, the Examiner has not responded to Applicants' arguments that Sugihara fails to disclose or suggest at least removing the protective member after inserting

¹ MPEP §707.07(f) requires that “[w]here the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it.”

an electroconductive substance into a micropore, as recited in Claim 1. Accordingly, these arguments remain rebutted.

Therefore, regarding independent Claim 1, Applicants reassert that Sugihara fails to disclose or suggest “removing said protective member from the electroconductive film on the first surface of said substrate,” as claimed. Applicants request that if the Examiner believes that Sugihara teaches removing a protective member, as claimed, that the Examiner comply with the requirements of MPEP § 707.07(f) and specifically respond to the above arguments in a new Office Action.

The Examiner asserts that the Ni and Au films of Sugihara Figures 5B through 5G disclose the protective member, as recited in Claim 1 of the present invention. (Office Action, p. 2). Indeed, as shown in Figures 5B through 5G, these layers are formed over a Cu foil layer on a polyimide film. However, these layers are not removed. In fact, Sugihara specifically teaches that both the Au layer and the Ni layer form a part of the resultant pads. (Para. 0178).

Additionally, Sugihara describes that the bump is formed by Ni plating, and therefore fails to disclose or suggest inserting an electroconductive substance into a micropore, as claimed. Further, because of the failure of Sugihara to disclose inserting an electroconductive substance into a micropore, Sugihara fails to necessitate bonding a protective member to the electroconductive film for protection from the pressure of inserting the electroconductive substance.

Therefore, it is clear that for at least the above reasons, Sugihara fails to teach or suggest all of the limitations of Claim 1 of the present invention. Further, Claims 4, 8-9 and 11 are patentable at least by virtue of their dependence on Claim 1. Applicants respectfully request that the rejection of Claims 1, 4, 8-9, and 11 over Sugihara be reconsidered and withdrawn.

Claims 1-11 over Takao. As an initial matter, Applicants note that with respect to the Examiner's maintained rejections of Claims 1-11 over Sugihara, the Examiner has again failed to respond to all of Applicants' arguments. Specifically, the Examiner has failed to respond to Applicants' argument regarding independent Claim 1 and dependent Claims 2 and 3, as set forth specifically at pages 9-10 of the Amendment filed on March 1, 2005. Again, in contrast to the requirements of MPEP §707.07(f), the Examiner has not responded to Applicants' arguments, regarding Claim 1, that Takao fails to disclose or suggest at least removing the protective member after inserting an electro conductive substance into a micropore, as recited, and, regarding Claims 2 and 3 that Takao fails to teach or suggest depositing the electroconductive substance by molten metal insertion method or printing method and that these limitations would not have been obvious to one of skill in the art. Accordingly, these arguments remain rebutted. Applicants request that if the Examiner believes that Sugihara teaches removing a protective member, as claimed, that the Examiner comply with the requirements of MPEP §707.07(f) and specifically respond to the above arguments in a new Office Action.

Regarding independent Claim 1, Applicants reassert that Takao fails to teach or suggest "removing said protective member from the electroconductive film on the first surface of said

substrate,” as claimed. The Examiner asserts that resin layer 212 and glass substrate 213 teach the protective layer, as claimed in the present invention. However, even assuming *arguendo*, that the resin layer and the glass substrate were protective layers, Takao fails to teach or suggest any removal of either the resin layer or the glass substrate.

Regarding Claims 2 and 3, Applicants reassert that Takao fails to teach or suggest either inserting the electroconductive substance into a micropore by a molten metal insertion method or inserting the electroconductive substance into a micropore by a printing method. The Examiner asserts that the motivation for one of skill in the art to modify the method of Takao to include these claimed steps is that “if an alternate conductor were chosen to fill the micropore, deposition by molten metal insertion and/or pressure methods would be possible and/or desirable.” (Office Action, p. 4). However, the Examiner fails to show that one of skill in the art would use an alternate conductor or that the use of an alternate conductor would make the claimed insertion methods obvious.

Therefore, it is clear that for at least the above reasons, Takao fails to teach or suggest all of the limitations of Claims 1, 2, and 3 of the present invention. Further, Claims 4-11 are patentable at least by virtue of their dependence on Claim 1. Applicants respectfully request that the rejection of Claims 1-11 over Takao be reconsidered and withdrawn.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/736,581

Q78469

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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